

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

1. (Currently Amended) A method for estimating a value of a vector of variables **p** in a mathematical model representing a physical process, where a state vector **x** of the model is estimated by a State Augmented Extended Kalman Filter (SAEKF),

wherein the vector of variables **p** represents one or more varying physical properties of the physical process and is representable by a function of the state vector **x**,

and wherein the method comprises the steps of

- a) measuring values ~~for measured variables~~ of an input vector **u**,
- b) incorporating the vector of variables **p** as an augmented state in the SAEKF, and
- c) computing an estimate of the complete state including the augmented state according to a SAEKF algorithm; and
- d) presenting the estimate to a user.

2. (Original) Method according to claim 1, wherein system equations of the model estimated by the SAEKF are representable as

$$\begin{bmatrix} \dot{\mathbf{x}} \\ \dot{\mathbf{p}} \end{bmatrix} = \begin{bmatrix} \mathbf{f}(\mathbf{x}, \mathbf{u}, \mathbf{p}) \\ \mathbf{0} \end{bmatrix} + \mathbf{v}$$

where $\mathbf{f}(\mathbf{x}, \mathbf{u}, \mathbf{p})$ represents a known dependency of the change $\dot{\mathbf{x}}$ in system state from the system state **x**, the measured values **u** and the vector of variables **p**, and **v** represents noise disturbances.

3. (Previously Presented) Method according to claim 1, comprising the step of estimating parameters of a representation of the vector of variables \mathbf{p} in terms of the state vector \mathbf{x} .

4. (Previously Presented) Method according to claim 1, wherein the physical process comprises a turbomachine, and the vector of variables \mathbf{p} represents at least one of an efficiency or a mass flow rate of the turbomachine.

5. (Previously Presented) Method according to claim 1, wherein the physical process comprises a heat exchanger, and the vector of variables \mathbf{p} represents at least one heat transfer coefficient of the heat exchanger.

6. (Previously Presented) Method according to claim 1, wherein the physical process comprises a mating gear transmission, and the vector of variables \mathbf{p} represents a backlash and spring function.

7. (canceled).

8. (Currently Amended) A Computer computer program embodied on a computer-readable medium for estimating a value of a vector of variables \mathbf{p} in a mathematical model representing a physical process which is loadable and executable on a data processing unit and which computer program, when being executed, performs the steps of: ~~according to claim 1~~

a) measuring values of an input vector \mathbf{u} ,

b) incorporating the vector of variables \mathbf{p} as an augmented state in a State Augmented Extended Kalman Filter algorithm;

c) computing an estimate of the complete state including the augmented state according to an output of the State Augmented Extended Kalman Filter algorithm; and

d) presenting the estimate to a user.

9. (Currently Amended) A ~~D~~data processing system comprising means for carrying out the steps of the method of: according to claim 4

- a) measuring values of an input vector u ,
- b) incorporating the vector of variables p as an augmented state in a State Augmented Extended Kalman Filter algorithm;
- c) computing an estimate of the complete state including the augmented state according to the output of the State Augmented Extended Kalman Filter algorithm; and
- d) presenting the estimate to a user.